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AMENDMENTS TO THE CLAIMS

1. (Currently amended) In a power amplifier system in which a digital input transmission signal is adaptively predistorted to compensate for non-linearities in an amplification process based on a difference between a desired and an observed amplifier output, a method of generating a digital error signal that accurately represents said difference, comprising:

adaptively processing the digital input transmission signal at least partially in response to the digital error signal to generate a first modified signal that complements non-linearities resulting from the amplification process;

converting the first modified signal to analog form to produce an analog modified signal, which is related to a signal that is amplified by the amplification process;

down-converting a radio frequency (RF) signal that represents an actual output of the amplifier system to generate a feedback signal;

processing the digital input transmission signal to provide the desired output signal and adaptively adjusting the processing to reduce a magnitude of [[the]] an analog error signal;

converting the desired output signal to analog form to produce an analog delayed signal;

taking a difference between the feedback signal and the desired output signal to generate [[an]] the analog error signal;

scaling the analog error signal to produce a scaled error signal that substantially corresponds to a range of an analog-to-digital converter; and

using the analog-to-digital converter to convert the scaled error signal to digital form to produce the digital error signal.

2. (Original) The method as in Claim 1, wherein processing the digital input transmission signal to generate the desired signal further comprises phase rotating the desired signal relative to the input transmission signal.

3. (Original) The method as in Claim 1, wherein processing the digital input transmission signal to generate the desired signal further comprises amplitude scaling the desired signal relative to the input transmission signal.

4. (Original) The method as in Claim 1, wherein processing the digital input transmission signal to generate the desired signal further comprises delaying the desired signal relative to the input transmission signal such that the desired signal is substantially time aligned with the feedback signal.

5. (Original) The method as in Claim 2, wherein adaptively processing the digital input transmission signal further comprises amplitude scaling the input transmission signal.

6. (Canceled)

7. (Canceled)

8. (Canceled)

9. (Canceled)

10. (Canceled)

11. (Canceled)

12. (Canceled)

13. (Currently amended) ~~The method as defined in Claim 9,~~ A method of generating an error signal that can be used to reduce distortion in a radio frequency (RF) output signal of an RF transmitter, the method comprising:

receiving an RF sample of the RF output signal of the transmitter;

down-converting the RF sample of the RF output signal to a down-converted signal;

receiving an input signal of the transmitter, where the input signal is digital;

delaying the input signal to produce a delayed input signal to approximately time align an analog delayed input signal with the down-converted signal, wherein delaying the input signal further comprises adaptively adjusting the delay in response to the error signal to further reduce the amplitude of the modified down-converted signal;

converting, from digital to analog, the delayed input signal to the analog delayed input signal;

combining the down-converted signal with the analog delayed input signal to produce a modified down-converted signal such that an amplitude of the modified down-converted signal is reduced relative to an amplitude of the down-converted signal; and

converting the modified down-converted signal, from analog to digital, to produce the error signal.

14. (Currently amended) ~~The method as defined in Claim 9, further comprising~~ A method of generating an error signal that can be used to reduce distortion in a radio frequency (RF) output signal of an RF transmitter, the method comprising:

receiving an RF sample of the RF output signal of the transmitter;

down-converting the RF sample of the RF output signal to a down-converted signal;

receiving an input signal of the transmitter, where the input signal is digital;

delaying the input signal to produce a delayed input signal to approximately time align an analog delayed input signal with the down-converted signal;

converting, from digital to analog, the delayed input signal to the analog delayed input signal;

combining the down-converted signal with the analog delayed input signal to produce a modified down-converted signal such that an amplitude of the modified down-converted signal is reduced relative to an amplitude of the down-converted signal;

converting the modified down-converted signal, from analog to digital, to produce the error signal; and

phase rotating the delayed input signal relative to the input signal to further reduce the amplitude of the modified down-converted signal.

15. (Original) The method as defined in Claim 14, further comprising adaptively phase rotating the delayed input signal relative to the input signal in response to the error signal to further reduce the amplitude of the modified down-converted signal.

16. (Currently amended) ~~The method as defined in Claim 9, further comprising~~ A method of generating an error signal that can be used to reduce distortion in a radio frequency (RF) output signal of an RF transmitter, the method comprising:

receiving an RF sample of the RF output signal of the transmitter;

down-converting the RF sample of the RF output signal to a down-converted signal;

receiving an input signal of the transmitter, where the input signal is digital;

delaying the input signal to produce a delayed input signal to approximately time align an analog delayed input signal with the down-converted signal;

converting, from digital to analog, the delayed input signal to the analog delayed input signal;

combining the down-converted signal with the analog delayed input signal to produce a modified down-converted signal such that an amplitude of the modified down-converted signal is reduced relative to an amplitude of the down-converted signal;

converting the modified down-converted signal, from analog to digital, to produce the error signal; and

scaling the delayed input signal relative to the down-converted signal such that the amplitude of the modified down-converted signal is further reduced.

17. (Original) The method as defined in Claim 16, further comprising adaptively scaling the delayed input signal relative to the down-converted signal in response to the error signal such that the amplitude of the modified down-converted signal is further reduced.

18. (Currently amended) ~~The method as defined in Claim 9, further comprising~~ A method of generating an error signal that can be used to reduce distortion in a radio frequency (RF) output signal of an RF transmitter, the method comprising:

receiving an RF sample of the RF output signal of the transmitter;

down-converting the RF sample of the RF output signal to a down-converted signal;

receiving an input signal of the transmitter, where the input signal is digital;

delaying the input signal to produce a delayed input signal to approximately time align an analog delayed input signal with the down-converted signal;

converting, from digital to analog, the delayed input signal to the analog delayed input signal;

combining the down-converted signal with the analog delayed input signal to produce a modified down-converted signal such that an amplitude of the modified down-converted signal is reduced relative to an amplitude of the down-converted signal;

converting the modified down-converted signal, from analog to digital, to produce the error signal; and

adaptively scaling an amplitude of the modified down-converted signal in response to the error signal to conform the amplitude of the modified down-converted signal to an input range of an analog-to-digital converter.

19. (Canceled)

20. (Canceled)

21. (Canceled)

22. (Currently amended) ~~The method as defined in Claim 20, further comprising~~ A method of responsively filtering a first component from a first signal to efficiently utilize an input range of an analog-to-digital converter used to detect and measure a second component of the first signal, the method comprising:

receiving the first signal;

receiving a second signal, where the second signal is related to the first component of the first signal;

delaying the second signal to align the second signal with the first component of the first signal;

subtracting the delayed second signal from the first signal to generate an error signal;

applying the error signal to the analog-to-digital converter; and

adjusting a relative amplitude of the second signal versus the first signal to decrease an amplitude of the error signal.

23. (Currently amended) ~~The method as defined in Claim 20, further comprising~~ A method of responsively filtering a first component from a first signal to efficiently utilize an input range of an analog-to-digital converter used to detect and measure a second component of the first signal, the method comprising:

receiving the first signal;

receiving a second signal, where the second signal is related to the first component of the first signal;

delaying the second signal to align the second signal with the first component of the first signal;

subtracting the delayed second signal from the first signal to generate an error signal;

applying the error signal to the analog-to-digital converter; and

adjusting a phase of the second signal versus the first signal to decrease an amplitude of the error signal.

24. (Canceled)

25. (Canceled)

26. (Canceled)

27. (Currently amended) ~~The RF transmitter as defined in Claim 26,~~ A radio frequency (RF) transmitter with adaptive predistortion comprising:

a predistortion circuit that predistorts an input signal to a predistorted input signal in response to maintained coefficients in a predistortion kernel, where the predistortion is substantially complementary to an intrinsic distortion in an RF power amplifier;

an RF up-converter, which produces a modulated a carrier wave from the predistorted input signal;

the RF power amplifier, which amplifies the modulated carrier wave;

a coupler, which provides an RF sample of the amplified modulated carrier;

an RF down-converter, which converts the RF sample of the amplified modulated carrier wave to a down-converted signal;

a digital filter adapted to delay the input signal to produce a delayed input signal;

a digital-to-analog converter that converts the delayed input signal to an analog delayed input signal;

a summing node adapted to combine the analog delayed input signal with the down-converted signal to generate a summed output such that the analog delayed input signal and the down-converted signal at least partially destructively interfere;

an analog-to-digital converter that converts the summed output to a digital summed output; and

an adaptive control processing and compensation estimator circuit that monitors the digital summed output and provides updates to the predistortion circuit such that the predistortion of the input signal remains substantially complementary to the intrinsic distortion of the RF power amplifier, wherein the adaptive control processing and compensation estimator circuit further updates the digital filter at least partially in response to the digital summed output, where the updates vary the delay of the digital filter to increase the destructive interference at the summing node.

28. (Currently amended) ~~The RF transmitter as defined in Claim 26,~~ A radio frequency (RF) transmitter with adaptive predistortion comprising:

a predistortion circuit that predistorts an input signal to a predistorted input signal in response to maintained coefficients in a predistortion kernel, where the predistortion is substantially complementary to an intrinsic distortion in an RF power amplifier;

an RF up-converter, which produces a modulated a carrier wave from the predistorted input signal;

the RF power amplifier, which amplifies the modulated carrier wave;

a coupler, which provides an RF sample of the amplified modulated carrier;

an RF down-converter, which converts the RF sample of the amplified modulated carrier wave to a down-converted signal;

a digital filter adapted to delay the input signal to produce a delayed input signal;

a digital-to-analog converter that converts the delayed input signal to an analog delayed input signal;

a summing node adapted to combine the analog delayed input signal with the down-converted signal to generate a summed output such that the analog delayed input signal and the down-converted signal at least partially destructively interfere, wherein the digital filter further phase rotates and amplitude scales the delayed input signal to increase the destructive interference at the summing node;

an analog-to-digital converter that converts the summed output to a digital summed output; and

an adaptive control processing and compensation estimator circuit that monitors the digital summed output and provides updates to the predistortion circuit such that the predistortion of the input signal remains substantially complementary to the intrinsic distortion of the RF power amplifier.

29. (Original) The RF transmitter as defined in Claim 28, wherein the adaptive control processing and compensation estimator circuit responds to the digital summed output to further update the digital filter to vary the delay, to vary the phase rotation, and to vary the amplitude scaling of the delayed input signal to increase the destructive interference at the summing node.

30. (Previously Presented) A circuit that generates an error signal that can be used by a pre-distortion circuit to reduce a distortion in a radio frequency (RF) output signal of an RF transmitter, the circuit comprising:

a digital filter adapted to delay and phase rotate an input signal of the RF transmitter along a side path, where the delay is configurable to approximately coincide with a first delay in time of a forward transmitting path and a return path with a second delay in time of the side path;

a first conversion circuit adapted to convert an output of the digital filter to a delayed version of the input signal, where the delayed version of the input signal is analog;

an RF down-converter adapted to convert an RF sample of the RF output signal to a down-converted signal;

a differencing circuit adapted to combine the output of the conversion circuit with the down-converted signal to produce a difference signal such that a main signal component of the down-converted signal is reduced in the difference signal by subtraction of the delayed version of the input signal from the down-converted signal; and

a second conversion circuit adapted to convert the difference signal to a digital form.

31. (Original) The circuit that is defined in Claim 30, wherein the differencing circuit is a summing circuit, and where a main signal component of the delayed version of the input signal is substantially out of phase with respect to the main signal component of the down-converted signal.

32. (Canceled)